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Dear Examiner Polk,

After reading your response and looking up 37 CFR 1.125(b) and (c) it is my understanding that I must submit a clean version of the amended specification in addition to the marked up version already supplied. I understand that I must also submit a statement, presumably signed, that the substituted specification includes no new matter. Is there a form used for this statement or is a cover letter with such a statement acceptable? Please let me know which is correct via email or fax.

Turning the response to Applicant arguments, with respect I ask you to reconsider your rejection based primarily on one fact. By definition there is no connection (or as emphasized in the amended submission no electrical connection) across the isolation barrier of an isolating component - no current will flow regardless of the voltage potential across the barrier. This is a fundamental definition, not one introduced in my application.

Szynal clearly states in both his specification and claims that the power supply isolates the supply voltages from the source of electric power. This leaves (46) as the lone connection to ac in Szynal. Inputs (20,22) are not connected to ac because of the isolation provided by (16). Again both of Szynal's independent claims (1, 5) state that the power supply isolates the supply from the source.

Since there is only one ac-dc electrical connection (46) presented or claimed in Szynal, the ac-dc circuitry employed by Szynal only creates one signal (on 46). Szynal can not compare the subsequent signal (46) to a signal created by another ac connection, as there is no additional connection to create another signal. Thus there is no need to explicitly claim there is no comparison of signals generated by the invention's circuitry because there is only one signal.

As to the argument that there is no conditioning circuit claimed, in Claim 5 (I assume as it is explicitly stated in Claim 1) I believe the zero crossing circuit in claim 5 is a subset of all conditioning circuits, i.e., a conditioning circuit that indicates zero crossings. In Szynal a conditioning circuit "shapes and conditions the voltage signal indicative of the door position and which provides the conditioned signal directly to the microprocessor ....".

Its shape and phase defined a signal. No reference signal is needed to detect a change in the shape of a signal. However; to detect a change in the phase of a signal a reference signal with a known phase is needed. Szynal's approach does not produce a second signal to be used as a reference hence any phase shift is undetectable. Since no means to detect a phase shift is mentioned in Szynal or claimed, if the zero crossing circuit in claim 5 does not shape the signal how does it indicate the position of the door as stated in claim 5?

I would agree that a zero crossing circuit need not necessarily be a conditioning circuit if that's all it did, but the zero crossing circuit in Claim 5 of Szynal also indicates door position to the microprocessor. To do this zero crossing circuit must shape, i.e., condition the signal for the microprocessor to indicate the door position. Therefore according to the description of a conditioning circuit in Szynal the zero crossing circuit in Claim 5 is a conditioning circuit.

Turning to the rejection of claims 1 and 11 the present invention has "...a plurality of electrical connections between digital nodes and ac nodes, said electrical connections being made through passive components, ~~the~~ and subsequent signals on digital nodes being compared ..." (Claim1). Szynal has only one connection (46) between digital and ac nodes. Therefore there is only one subsequent signal eliminating the possibility of comparison to another ac-dc connection produced signal.

I believe this establishes a clear difference between the claims of Szynal and the present invention. I will admit claims 2 and 12 must stand on the basis of the validity of claims 1 and 11 respectively.

However claims 3 and 13 can stand on their own. When a load component fails, becomes non-functional, typically it becomes an open circuit. As described in the Second Embodiment the present invention can determine the functionality of a load component by determining if the path containing the component is open. "To ~~determine~~ ascertain the functionality of the solenoid of 60 and the heating element 80 the control scans their paths when their transducers are inactive. An intact path indicates a functional transducer. If a path is open, its transducer is non-functional either because it or a part of the circuit has failed."

The presence of the load (12) in the circuit does not mean the Szynal approach determines the functionality of 12. If 12 were to fail, i.e. become an open circuit, or be removed from the circuit, the signal generated by the circuit in Szynal would not be altered. When (26) is closed (40) still is connected to neutral. When (26) is open the end of (40) connected to (12) is at L_1 regardless if (12) is there or not, as no current will flow through it in either case.

Szynal only determines the state of (26) and therefore while it can determine when a functional (12) is functioning. However it can not determine if (12) is functional.

Granted, claims 4 and 14 depend on the validity of claims 1 and 11 respectively.

Turning to claims 5 and 15, to prevent shock simply placing a resistor in a path does not show the ability to protect the operator from shock. The impedance between 120 vac and a grounded person must be at least 120,000Ω to ensure that the current remains below the threshold of sensation ~ 1.5ma. As (46) is connected through both (44) and (42) the combined impedance of these paths must be at least 120,000Ω. If the impedance of each were equal each would need an impedance of 240,000Ω or more. If you are thinking that limiting the current to levels the microprocessor is sufficient to protect a grounded operator – typical input protection on microprocessors can handle 20ma (12 times the minimum to produce shock) which is enough to cause paralysis when passed through the body.

Further (44) could be reduced to 0Ω without harming the microprocessor because the power supply is isolated. Indeed Szynal would seem to prefer a low value of resistance when he states " ... by virtue of not referencing the control circuit to a common ground with the power source, the low voltage electronic control will ride on the voltage present on line L_1." So (44) need not be there to limit the current between ac and the digital nodes, it is there so the conditioning circuit can shape the input received the microprocessor, however should a grounded operator touch a supply voltage with (44) at 0Ω death is a possibility.

Part of the source-supply current in Szynal loop is completed solely by the intrinsic impedance between the circuit and ac. Basically the approach conditions the ac noise on (46). This is a very small signal and not very well defined. Given that line voltage can vary ±20%, intrinsic impedance is widely variable and all components have tolerances the ac noise on (46) is difficult to predict under all circumstances.

If the impedance of the conditioning circuit between ac and (46) is made large enough to protect the operator the microprocessor may not even detect the ac noise let alone the change in shape of the noise. The signal is especially small when (26) is closed and the current through (44) is bled off through (42) to neutral.

If Szynal's approach can be made to function while placing sufficient impedance between ac and the digital circuitry to protect the operator why isn't it claimed or even mentioned? At the very least it is not obvious how or if this can be accomplished.

Additionally, in the case of claim 15, for non-reactive components to limit the current between the source and supply to safe levels, sufficient resistive components must be in each path between the source and supply. However, there is a path solely through (30), providing no protection, and reactive component (42), which clearly does not have sufficient resistance to prevent shock. Even if (44) were infinite the circuit cannot meet the requirement of Claim 15 that there be sufficient non-reactive impedance between the source and supply to protect the operator.

If Szynal's approach can be made to function while placing sufficient resistance between ac and the digital circuitry to protect the operator why is it missing the preferred embodiment?

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